

Scientific Note

NOCTURNAL CLUSTERING OF THE SOLITARY WASP, *CHALYBION CALIFORNICUM* (SAUSSURE) (HYMENOPTERA: SPHECIDAE)

Chalybion californicum (Saussure) is a solitary wasp that provisions its nest with spiders. It appears to make its nest in preexisting cavities, especially in abandoned nests of the sphecid mud-daubers, *Sceliphron*. After provisioning the nests, females close the entrance with mud (Bohart, R. M. & A. S. Menke. 1976. Sphecid wasps of the world, a generic revision. University of California Press, Berkeley). *Chalybion californicum* occurs throughout most of the United States, and also has been reported from southern Canada, northern Mexico, Hawaii and Bermuda (Bohart, R. M. & A. S. Menke. 1963. Univ. Calif. Publ. Entomol., 30: 91–182). This note confirms previous reports (Weiss, H. B. 1944. Entomol. News, 55: 270–271, Ward, G. L. 1972. Proc. Indiana Acad. Sci., 81: 177–181) that *C. californicum* aggregates nightly in the same location in successive seasons.

We observed a dense cluster or “sleeping aggregation” (Evans, H. E. & E. G. Linsley. 1960. Bull. So. Calif. Acad. Sci., 59: 30–37) of *C. californicum* that appeared nightly beneath an overhanging eave of a ground-level apartment in Riverside, California. The aggregation was first noticed in mid-June 1989 and the number of individuals in the aggregation during the summer was estimated to be about 50. This number declined noticeably in September, and the last individual was seen on 13 Oct 1989. In late April 1990, the aggregation site was examined nightly; no wasps were seen until 8 May when approximately 12 individuals aggregated. The synchronous reappearance of the wasps after the long winter absence was striking. The number of individuals fluctuated between three and 16, during 8–29 May. On 2 June the number increased abruptly to 27, then to 45–50 on 3 June. Through the remainder of June and July, the number of individuals in the aggregation was estimated as 65–70. The number began to decrease gradually in August; the rate of decrease was more rapid later in the month than earlier. Between late September and mid October, the number of individuals was down to about 20 and fluctuated up and down nightly. Between the evenings of 14 and 15 Oct, the number dropped sharply from approximately 15 to seven. On the morning of 16 Oct, we marked the remaining wasps with paint to see if they would overwinter and return again next year. This was the last that the wasps were seen in 1990; however, it is uncertain if the disturbance that we caused the wasps when we marked them hastened their departure from the aggregation site.

Each year the aggregation site was the exact same spot on a 15 × 15 cm wooden pillar where it joined with an eave approximately 2.4 m above the ground (Fig. 1). The eave was on the east side of the apartment and the wasps aggregated on the north side of the pillar. In late afternoon, the wasps flew around the aggregation site and some landed. Gradually more landed until all were settled one to several hours before dark. In cooler weather (e.g., 8 May–1 June 1990, with daily max-



Figure 1. Aggregating *Chalybion californicum*.

imum temperatures between 19 and 30° C), they generally aggregated earlier (approximately 16:00–16:30 h); in hotter weather (e.g., 2–4 June 1990, maximum temperatures between 35 and 38° C), they aggregated later, about 18:00–18:30 h. During the period 8 May–4 June, the morning dispersal was not observed; however, on cooler days they usually were not dispersed before 07:30 h, although on hot days most had dispersed by 07:30.

At 22:00 h, 7 Sep 1989, the aggregation contained roughly 40–50 individuals and we collected 10 for sex determination; of these, six were male and four were female, demonstrating that both sexes were present. We did not observe any mating behavior; however, because our observations were not continuous, we cannot say for certain that mating did not occur.

Weiss (1944) initially documented the reappearance of *C. californicum* at the same aggregation site in New Jersey in five successive summer seasons with intervening winters when the wasps were absent. Weiss (1944) suggested that a chemical aggregation cue (pheromone) persisted at the site from autumn to spring. However, this does not seem likely because the pheromone would have to persist throughout the winter and remain potent enough to attract wasps from a distance in the spring. Nonchemical aggregation cues, such as visual cues, would be more likely to persist from one season to the next. Alternatively, we suggest that the aggregation in the spring may consist of the same individuals that were present in the fall and that the overwintered wasps remembered the aggregation site in the same manner that wasps learn and remember the location of nesting sites (Evans, H. E. & M. J. W. Eberhard. 1970. *The wasps*. University of Michigan Press, Ann Arbor). This may provide a more likely explanation for the synchronous reappearance of 12 wasps on 8 May 1990, as opposed to a scenario where newly emerged wasps were searching for a nocturnal resting site and 12 wasps were attracted to the same physical cue for the first time on the same night. However, a weakness in our hypothesis is that *C. californicum* is reported to overwinter as a prepupa (Rau, P. & N. Rau. 1916a. *J. Anim. Behavior*, 6: 27–

63). To test our hypothesis, we marked some individuals in autumn 1990 and will watch for their reappearance in the spring of 1991.

Nocturnal aggregations of several species of *Chalybion* have been reported: *C. californicum* (= *C. caeruleum* [L.]) (Rau, P. & N. Rau. 1916b. Ann. Entomol. Soc. Am., 9: 227–274; Rau, P. 1938. Ann. Entomol. Soc. Am., 31: 540–556; Weiss 1944; Ward 1972), *C. zimmermanni* Dahlbom (Rau, P. 1942. Can. Entomol., 74: 196), *C. bengalense* (Dahlbom) (= *C. violaceum* [Fabr.]) (Williams, F. X. 1928. Hawaiian Sugar Planters' Assoc., Entomol. Ser. Bull., 19: 1–179; Jayakar, S. D. & R. S. Mangipudi. 1965. J. Bombay Nat. Hist. Soc., 61: 708–711), and *C. japonicum* (Gribodo) (= *Sceliphron inflexum* Sickmann) (Iwata, K. 1963. Trans. Shikoku Entomol. Soc., 7: 114–118). All four species are in the subgenus *Chalybion*; *C. californicum* and *C. zimmermanni* are New World species, and *C. bengalense* and *C. japonicum* are Old World species (Bohart & Menke 1976). The aggregations of these four species consisted of both sexes although no mating behavior was observed by Rau & Rau (1916b) or Ward (1972) or by us. Therefore, the aggregations do not appear to facilitate mating. By day, *Chalybion* spp. are solitary wasps; why they aggregate at night has remained a mystery since Rau & Rau first described this behavior in 1916.

Acknowledgment.—We thank R. M. Bohart for his identification; a voucher specimen from this study is deposited in the UCR Entomological Teaching and Research Collection, University of California, Riverside.

T. R. Prentice and G. P. Walker, *Department of Entomology, University of California, Riverside, California 92521.*

Received 20 July 1990; accepted 7 February 1991.

PAN-PACIFIC ENTOMOLOGIST
67(3): 224–226, (1991)

Scientific Note

OCCURRENCE OF *COCCINELLA SEPTEMPUNCTATA* (L.) (COLEOPTERA: COCCINELLIDAE) IN CENTRAL BRITISH COLUMBIA

Coccinella septempunctata (L.), the seven spotted lady beetle (C7), is a Palearctic predator intentionally introduced into North America numerous times since 1956 for the biological control of aphids (Angalet, G. W., J. M. Tropp & A. N. Eggert. 1979. Environ. Entomol., 896–901; Schaefer, P. W., R. J. Dysart & H. B. Specht. 1987. Environ. Entomol., 16: 368–373). During 1973 it was found to be established in both northern New Jersey and Quebec (Angalet, G. W. & R. L. Jacques. 1975. USDA Coop. Econ. Insect Rep., 25: 883–884; Laroche, A.